

CONTINUOUS STEEL GIRDER DEFLECTIONS

The attached sheet illustrates the method to be used for showing camber diagrams for continuous steel girders.

The header camber "HC" curves are the recommended adjustment of the headers or supports for the deck pours to obtain the theoretical finished roadway grade. The calculation of the deflections and offsetting camber curves are based on the following assumptions:

1. All steel in the structure has been erected at once.
2. All deck concrete is placed at once and no consideration is made of composite action caused by sequence of concrete placement. The temperature change during the day may cause a noticeable change in deflected shape.
3. The "HC" curves are referenced to the theoretical finished deck surface at all times.
4. The actual support or header grades will be determined by the Engineer during the construction phase because there may be approved variances from the assumptions.

The sequence of concrete deck placing should be shown on the plans to minimize the following:

1. Tension in previously placed concrete.
2. Variations from the assumptions that all deck concrete is placed at once.

In the event more sophisticated camber calculation assumptions appear worth while it would probably be best to consider them later in conjunction with the review of the structural steel working drawings.

The web camber "WC" curves are the adjustments to the girder fabrication geometry. General policy is to make the top of the web approximately parallel to the top of deck. This results in a uniform depth of fillet, except for fabrication tolerances, and makes for simplification of deck forms.

1. The girder webs will be fabricated in a horizontal or no-load condition.
2. Field splices of the girders will be made in a no-load condition.
3. The "WC" curves are defined as the top of the girder web under no-load conditions.
4. The "WC" curves are referenced to straight lines intersecting the top of the girder web at centerline of bearing. Special considerations should be given to box sections and especially to box

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sections with sloping girders. The camber must be defined as "vertical displacement" with the use of sloping webs.

5. The contractor's erection procedure may vary from the design assumption of no-load field splices under the current special provisions and the Standard Specifications. The contractor is required to submit revised cambers and stresses during the review of the working drawings.

The various components that make up the web camber and header camber are discussed in the current Memo to Designers 16-3. A good reference for design calculations of the camber components for continuous girders is Part I & Part II articles "Deflections of Bridge Structures" in the *Bridge Notes* publications of July 1962, and April 1963, respectively.

The uniform use of the illustrated camber curves and reference lines is necessary for the following reasons:

1. Header camber curves can be added algebraically to the grid or contour grades.
2. Web curves can be uniformly applied to the girder geometry by the fabricator using grades shown elsewhere on the plans.
3. M&R inspectors will have uniform information for checking girder camber.

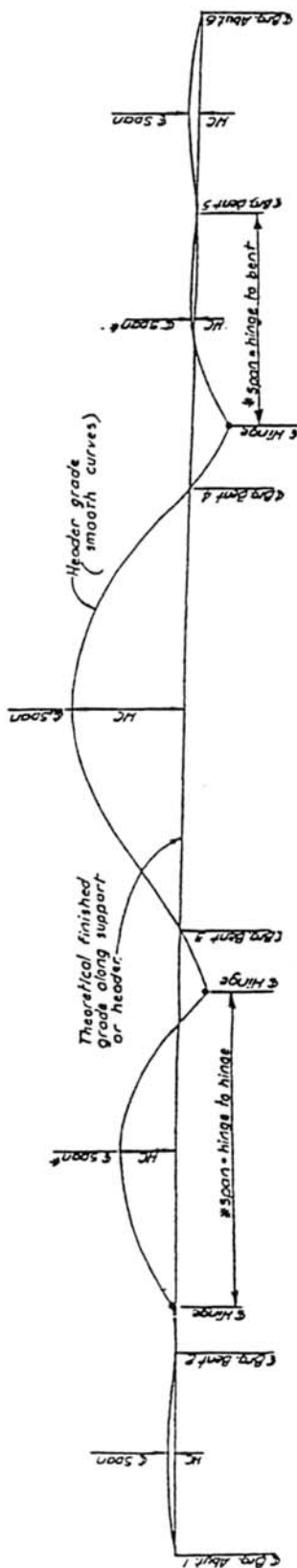


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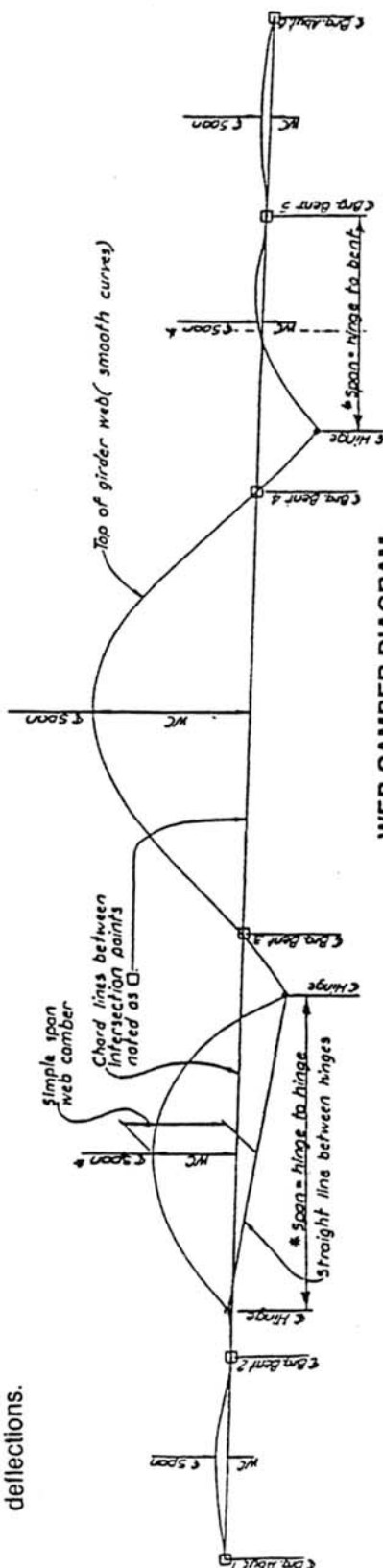
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SUPPORT OR HEADER CAMBER DIAGRAM

Adjust support or header grades to HC curve shown before the start of any concrete deck placing and after erection of all girders that influence deflections.



WEB CAMBER DIAGRAM

Fabricate girder web to WC curve shown when performing fabrication in a no-load condition.

Camber curve value components in feet	Span No. 1	Span No. 2	Span No. 3	Span No. 4	Span No. 5
1. Deck Dead Load	1/4	3/4	1/4	3/4	3/4
2. Curb + Rail + AC	.00	.01	.01	.01	.01
3. Deck Shrinkage	.01	.02	.02	.02	.02
4. Girder Dead Load	.00	.00	.00	.00	.00
5. Vertical Curve	.01	.02	.02	.02	.02
6. Horizontal Curve	.01	.02	.02	.02	.02
7. Additional Camber	.01	.02	.02	.02	.02
HC = Sum of 1+2+3	.02	.04	.04	.04	.04
WC = Sum of 1 thru 7	.02	.04	.04	.04	.04
Simple span Web camber	.02	.04	.04	.04	.04

CAMBER TABLE

Camber values are measured upwards from reference line except when shown negative (-), measure downwards. Support or header grades will be determined by the Engineer.

* Designer should modify the note on determination of stud connector height if additional camber is used.